HyMeX CORSICA Atmospheric Observation Platform in the frame of the MISTRALS special, enhanced and long-term observation periods



Contact: Dominique Lambert (LA, UMR5560, Université de Toulouse) - dominique.lambert@aero.obs-mip.fr

In the western Mediterranean basin. Corsica is an 80 km×180 km island, on which the highest mountain reaches 2710 m and about twenty mountains are higher than 2000 m. These mountains, which run roughly from North-West to South-East, are the highest of any Mediterranean island. Furthermore, Corsica has the most rivers of any Mediterranean island. It is regularly affected by intense meteorological events; windstorms, heavy precipitation, Saharan dust events, waves and coastal erosion, droughts, forest fires, and lightning. Moreover, it is influenced by different air masses of various origins allowing the study of both marine and continental (including anthropogenic pollution, biomass-burning, biogenic, and mineral dust) aerosols and of regional ozone pollution events in the NW Mediterranean. The long dry and sunny Mediterranean summer season that characterizes the regional climate and air mass recirculation in the western basin favours the accur nulation of aerosol and ozone.

CORSICA (Corsican Observatory for Research and Studies on Climate and Atmosphere - ocean environment - Centre d'Observation Régional pour la Surveillance du Climat et de l'environnement Atmosphérique et océanographique en Méditerranée occidentale) is a scientific platform dedicated to the observation of the physics and chemistry of the atmosphere. It is located in the western Mediterranean basin, on the island of Corsica. This location allows the site being exposed to air mass of various origins. It can also act as a sentinel for continental France and for Italy or, at a larger scale, for countries further east by measuring weather phenomena or air quality.

The platform has been in operation since 2007. It combines several measuring sites on Corsica for atmospheric chemistry (gases and aerosols), dynamics, microphysics, and atmospheric electrical activity

The atmospheric platform has a twofold mission: firstly, to serve as a permanent structure for observing the atmosphere particularly suited to the climate change studies, and secondly, to provide a platform for measurement campaigns





535 days (24h) of valid ACSM data at Cap Cors A component of the ACTRIS-ACSM network (QA/QC controlled datasets

A unique dataset to investigate sources (primary/secondary) and geographic origin of OA in W. Mediterra

Example 3: Wind profilers

ChArMEx



dropplets. The later estimation (blue curve) is of course the right measurement.

Example 5: KIT in Corsica: Ground based and airborne observations of convection

g ko

period (framed). The observations on the left panels are from the UHF . wind profiler radar installed in Pianottoli-Caldarello. They allow to detect with accuracy, the different kinds of rain. hydrometeores: snow or ice and their evolution with time. The rain rate at the ground can also be calculated (right panels). We benefit here from the colocation of the UHF and the mini-VHF that

Water vapour mixing ratio and wind around and above Corsisa from Dornier 128 research aircraft

D-IBUF of TU Braunschweig based at Solenzara

Survey of a rain episode

24 and 25

CORSiCA has funded advanced instruments installed on multiple sites in Corsica their operation and maintenance and a technical local in the Cap Corse.

Corsica is relevant for HvMeX and ChArMEx studies because it is: located near the Gulf of Genoa, the most W. Mediterranean cyclogenesis area; regularly affected by intense weather events (windstorms, heavy precipitation Saharan dust events, waves and coastal erosion, drought, forest fire, lightning...); located upstream of the most intense precipitation event affecting the continental South-Eastern France and the Northern Italy South of the Alps;
located in the oligotrophic zone of the Mediterranean western basin enabling to

 study the impact of atmospheric deposition on primary production;
 influenced by different air masses from various origins allowing to study, polluted, biomass-burning, marine and mineral dust aerosols and their mixing; • well located to follow long-term changes of different gaseous and particulate compounds on the Mediterranean Basin;

Example 2: Sunphotometer and lidar observations **AERONET AOD timeseries** INRA LIDAR timeseries

VESSAER (VErtical Structure and Sources of AERosols in the Mediterranean Region) campaign was conducted in Corsica with the ENDURO-KIT ultra-light aircraft between 25 June and 13 July 2012. VESSAER activities include airborne measurements over the eastern part of Corsica, aerosol lidar (right figure) and

Europe

supphotometer measurements (left figure) near the coast, and ground-based observations in the central (Venaco) and northern (Ersa) regions Two Saharan dust outbreaks were observed during VESSAER, as well as polluted outflows from Europe. In the frame of CORSiCA, sun photometer and lidar observations are maintained on a long-term period to improve knowledge on the variability of aerosol in North-western Mediterranean atmosphere and their impact on regional climate.

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The deployment of the integrated atmospheric observation system KITcube during HyMeX together with a research aircraft allowed comprehensive measurements. Using data from an operational GPS network, radiosondes and microwave radiometers, the spatio-temporal variability of integrated water vapour (IWV) and convection-related parameters in the preconvective environment over the island were studied. Spatial differences in the IWV evolution occurred frequently: In the interior of the island the IWV strongly increased around noon, while on the upstream coast only small variations observed. The transport of water vapour with thermally driven circulations and the formation of elevated humidity layers due to advective venting caused diurnal IWV variations over and downstream of the mountains.





conditions

Lightning activity is a strong

electrification processes that

involve dynamical and microphysical cloud

potential applications.

characteristics. Lightning

indicator of convection and high

precipitation since it results from

information is currently explored

for providing new insight in the

precipitation events (HyMeX)

and can be very useful in many

http://lma.aero.obs-mip.fr/

nerical prediction of heavy

CORSICA is carried by the University of Toulouse and organized around a consortium with five partners (University of Corsica, University of Clermont-Ferrand, University of Dunkerque, CEA Saclay, Mines Douai). Qualitair Corse and Météo-France CDM 2A and 2B are also involved in the project.

CORSiCA sponsors:

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Time (LT)

Typical evolution of the mountain ABL, wind

systems, temperature and humidity at Corte

1700 2000







